

RESPONSE OF SAW PALMETTO TO THREE HERBICIDES
DURING THE FIRST GROWING SEASON¹

J. L. Michael
George W. Andrews Forestry Sciences Laboratory
Southern Forest Experiment Station
Devall Street
Auburn, Alabama 36830

ABSTRACT

Trimec 881 and 823 (mixture of 2,4-D; MCPP and dicamba in 2:1:0.1 and 1:1:0.25 ratio respectively) and trichlopyr ester were evaluated for effectiveness against saw palmetto, Serenoa repens (Bartram) Small, when they were applied at three rates in April, June, and August. Herbicides were most effective with April application, least effective in June, and intermediate in August. All rates applied in April gave at least 40% topkill, but trichlopyr at 14 and 28 l/ha applied in 935 l/ha water in April gave the best results.

INTRODUCTION

Saw palmetto occurs in the lower coastal plain from Louisiana to South Carolina. It is most abundant in Florida, covering 2 to 2.8 million ha (2). It is sympatric with longleaf pine, Pinus palustris Mill., and slash pine, P. elliottii Engelm. Saw palmetto can hinder natural regeneration of pine and is a pest in pasture lands.

Control of saw palmetto has been partially achieved through repeated mechanical clearing and fire. Chemical control has been attempted with many chemicals, including TCA; amitrol; endothal; CIPC; MCP; maleic hydrazide; dalapon; erbon; 2,4-D amine; 2,4-D ester; 2,4,5-T ester; 2,4,5-TP and combinations of the phenoxy esters (1,2,3,4). Of these dalapon, erbon, TCA, and the phenoxy herbicides have been the most active on saw palmetto. But dalapon activity is low, and erbon, which had long lasting residual effects, is no longer available. TCA gives only short-term crown control and has to be applied at high rates (67-112 kg/ha). The phenoxy herbicide, 2,4,5-T has given the best, though variable control, but is now

¹Discussion of herbicides in this paper does not constitute recommendation of their use or imply that uses discussed here are registered. If herbicides are handled, applied, or disposed of improperly, they can harm humans, domestic animals, desirable plants, and pollinating insects, fish, or other wildlife, and may contaminate water supplies. Use herbicides only when needed and handle them with care. Follow the directions and heed all precautions on the container label.

Use of trade names is for the reader's information and convenience. Such use does not constitute official endorsement or approval by the U.S. Department of Agriculture to the exclusion of any other suitable product.

under emergency suspension by EPA. So no acceptable chemical methods for saw palmetto control are currently available. This study was conducted to determine: 1) efficacy of trichlopyr and esters of 2,4-D + MCPP + dicamba on saw palmetto; and 2) if time of year affected control. The preliminary results based on one season's observations are reported in this paper.

MATERIALS AND METHODS

The study was conducted on the Wakulla District of the Apalachicola National Forest near Tallahassee, Florida in 1979. A preliminary test was installed in April. Additional applications were made in June and August.

The formulations tested were: 1) Trimec 881 (T881) containing 2,4-D + MCPP + dicamba (0.264 + 0.132 + 0.026 kg ae/l); 2) Trimec 823 (T823) containing 2,4-D + MCPP + dicamba (0.240 + 0.240 + 0.060 kg ae/l); and 3) trichlopyr ester (M4021) containing 0.48 kg ae/l of trichlopyr. All treatments were applied in 935 l/ha of water as carrier.

April treatment. Five clumps of mature palmetto were randomly selected and tagged for each treatment. Herbicide was applied with a hand pump sprayer. T881 and T823 were applied at the rates of 4.7, 9.4, and 18.7 l/ha. M4021 was applied at 7, 14, and 28 l/ha.

June and August treatments. The three herbicides were each applied at three rates with three replications to twenty-seven 0.04 ha plots on June 13-14 and twenty-seven more plots August 22-23 for a total of 54 plots arranged in a completely randomized design. Spraying was done with a tractor-mounted boom-sprayer. T881 and T823 were applied at the same rates used in the April treatment; M4021 was applied at 4.7, 9.4, and 18.7 l/ha.

Evaluation. Treatments were evaluated August 22 and November 6-7, 1979. Topkill was estimated to the nearest 5 percent. I reevaluated 16 plots on November 8 and determined the precision of the estimates by regression of the November 7 plot estimates against the November 8 plot estimates. Data for each treatment time were submitted to analysis of variance, the April treatment a 1-way analysis and the other treatments a 2-way analysis. Significance was determined at the .05 level. When there was a significant F test, Duncan's Multiple Range test was applied at the .05 probability level.

RESULTS AND DISCUSSION

Figure 1 shows results of the November evaluation. The most effective treatment for all application dates was M4021.

April treatment. The M4021 treatments at 14 and 28 l/ha were significantly better than either of the other treatments but were not different from each other. The next best treatment was T881 at 9.4 l/ha. That T881 at 9.4 l/ha was better than T881 at 18.7 l/ha appears strange, but very high rates of phenoxys can injure tissue and so, reduce translocation; the

result is lower effective kill. One of the five replicates for the 9.4 l/ha rate was estimated at 100% topkill. I do not know why this high value occurred, but it is probably due to some factor other than variability between estimates. Precision of estimates was determined for plot estimates made on consecutive days on the same plots. The correlation coefficient for these estimates was .957.

June treatment. M4021 at 18.7 l/ha was significantly better than all other treatments. No significant difference exists among the means for the other treatments.

August treatment. M4021 at 18.7 l/ha was the best treatment. At 9.4 and 4.7 l/ha, M4021 was not significantly different from T881 at 18.7 l/ha or T823 at 9.4 l/ha and 18.7 l/ha.

The August 23 evaluation of the April and June application indicated that both 18.7 l/ha of T823 and 14 l/ha of M4021 applied in April gave 99% topkill. In the June application, 18.7 l/ha of T823 gave 82% topkill, and 9.4 l/ha of M4021 gave 85%. By November only the highest rate of M4021 was significantly different from the other treatments. When summer-long control is all that is required, T823 and M4021 are equally effective but only M4021 effects season-long control.

Figure 2 plots the seasonal aspects of saw palmetto response to T823 at 18.7 l/ha. These results are similar to those reported by Grelen (1) for 2,4,5-T. But he attributed the drop in kill for the period May-June to some physiological factor related to flowering and fruiting. For my April application, the most effective, the palmetto was in flower. The summer drop in susceptibility to the chemicals may be due to dormancy, perhaps induced by water stress. Plants grew considerably August 23 to November 7 with some of the test plants in the June application adding five new leaves. This period of renewed growth was concurrent with an increase in susceptibility to herbicide as evidenced by the increased effectiveness of the August treatment over the June treatment. The seasonal response of saw palmetto to herbicides suggests that herbicide testing should be restricted to the Spring and Fall.

LITERATURE CITED

1. Grelen, H. E. 1960. Seasonal foliage applications of 2,4,5-T on saw palmetto. Proc. Southern Weed Conference. 13:109-112.
2. McCaleb, J. E., E. M. Hodges, and C. L. Dantzman. 1960. The response of saw palmetto to several herbicides. Proc. Southern Weed Conference. 13:113-117.
3. Nation, H. A. 1950. Two chemicals appear promising for control of palmetto. Proc. Southern Weed Conference. 3:172-174.
4. Nation, H. A. 1951. Palmetto can be controlled with chemicals. Proc. Southern Weed Conference. 4:94-96.

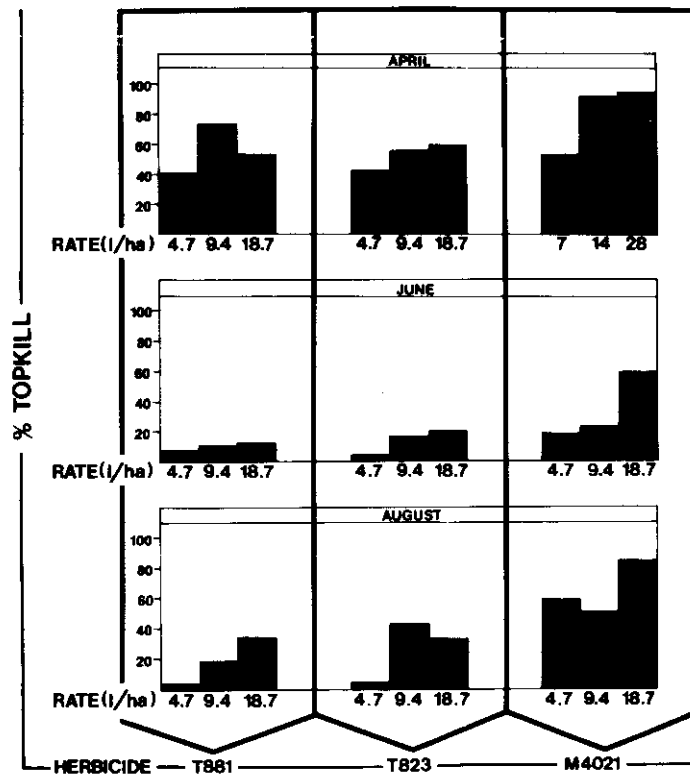


Figure 1. SAW PALMETTO TOPKILL FOR ALL TREATMENTS (November 1979 evaluation)

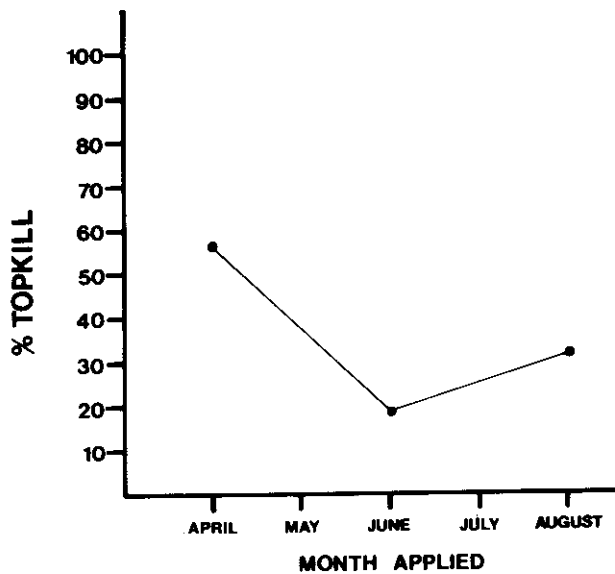


Figure 2. SEASONAL RESPONSE OF SAW PALMETTO TO 18.7 l/ha OF TRIMEC 823